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YALE UNIV NEW HAVEN CT DEPT OF ENGINEERING AND APPL--ETC F/G 12/1
STRUCTURE OF AUTOMATIC CONTROL SYSTEMS.(U)
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STRUCTURE OF
AUTOMATIC CONTROL SYSTEMS
FINAL SCIENTIFIC REPORT

for the period

October 1, 1976 - September 30, 1981

Submitted to the

UNITED STATES AIR FORCE OFFICE OF SCIENTIFIC RESEARCH
under

AFOSR GRANT NO. 77-3176

A. Stephen Morse, Principal Investigator
May 28, 1982

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I. INTRODUCTION

This is the final scientific report for AFOSR Grant No. 77-3176 covering the period October 1, 1976 to September 30, 1981. The work described below was undertaken in accordance with our previously submitted proposals.

II. COMPLETED WORK

A. Research Reports and Papers

During the grant period, research leading to the following technical reports and papers was completed.

- [1] A. Feuer, "Local Stability of Parameter-Adaptive Control Systems," Proc. Johns Hopkins Conference on Information Sciences and Systems, March 1978.
- [2] Arie Feuer, "Adaptive Control of Single-Input, Single-Output Linear Systems," Yale University Doctoral Thesis, May 1978.
- [3] A. Feuer and A. S. Morse, "Adaptive Control of Single-Input, Single-Output Linear Systems," IEEE Trans. Auto. Control, June 1978.
- [4] A. Feuer, B. R. Barnish, A. S. Morse, "An Unstable System Associated with Model Reference Adaptive Control," IEEE Trans. Auto. Control, June 1978.
- [5] A. S. Morse, "Open Problems in the Theory of Parameter Adaptive Control," Proc. IEEE Conference on Decision and Control, January 1979.
- [6] J. M. Potter, B.D.O. Anderson and A. S. Morse, "Single-Channel Control of a Two-Channel System," IEEE Trans. Auto. Control, June 1979.
- [7] M. E. Evans, "Minimal Realization of k-Powers," Proc. 1980 Princeton Conference on Information Sciences and Systems, March 1980.
- [8] A. S. Morse, "Global Stability of Parameter-Adaptive Control Systems," IEEE Trans. Auto. Control, June 1980.

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MATTHEW J. KEMPER
Chief, Technical Information Division

- [9] M. E. Evans, "Problems in Nonlinear System Realization Theory," Yale University Doctoral Thesis, May 1981.
- [10] M. E. Evans, "Minimal Realizations of 2-powers: Parameterization of the Symmetric Transfer Function, S & IS Report No. 8107, June 1981.
- [11] A. S. Morse, "Parameterizations for Multivariable Adaptive Control," Proc. IEEE Conf. on Decision and Control, December 1981.
- [12] A. S. Morse, W. A. Wolovich, B.D.O. Anderson, "Generic Pole Placement: Preliminary Results," Proc. 20th IEEE Conf. on Decision and Control, December 1981.

B. Presentations

During the grant period the following papers were presented at technical conferences.

- [1] A. Feuer, "Adaptive Control of Single-Input, Single-Output Linear Systems," Tri-State Symposium on System Theory, University of Connecticut, April 1977.
- [2] A. S. Morse, "Adaptive Control of Single-Input, Single-Output Linear Systems," IEEE Conference on Decision and Control, December 1977.
- [3] A. S. Morse, "Adaptive Control," Meeting on Mathematical System Theory, San Juan, Puerto Rico, December 1977.
- [4] A. Feuer, "Local Stability of Parameter-Adaptive Control Systems," Johns Hopkins Conference on Information Sciences and Systems, March 1978.
- [5] M. E. Evans, "A Characterization of Two-Power Systems Using an Internally Bilinear Model," Tri-State Symposium on System Theory, Brown University, May 1978.
- [6] A. S. Morse, "Open Problems in the Theory of Parameter Adaptive Control," IEEE Conference on Decision and Control, January 1979.

- [7] A. S. Morse, "Decentralized Control," Lund Institute of Technology, Lund, Sweden, March 1979.
- [8] A. S. Morse, "Global Stability of Parameter Adaptive Control Systems," Lund Institute of Technology, Lund, Sweden, March 1979.
- [9] _____, Harvard University, April 1979.
- [10] _____, Purdue University, September 1979.
- [11] _____, Notre Dame University, September 1979.
- [12] _____, IEEE Conference on Decision and Control, December 1979.
- [13] M. E. Evans, "Minimal Realization of k-Powers," Princeton Conference on Information Sciences and Systems, March 1980.
- [14] A. S. Morse, "Parameterization for Multivariable Adaptive Control," Johns Hopkins Conference on Information Sciences and Systems, March 1980.
- [15] _____, Yale Workshop on Adaptive Control, May 1981.
- [16] _____, IEEE Conference on Decision and Control, December 1981.
- [17] A. S. Morse, "Generic Pole Placement: Preliminary Results," Harvard University, May 1981.
- [18] _____, Workshop on Mathematical System Theory, Bielefeld, Germany, June 1981.
- [19] A. S. Morse, "Recent Problems in Parameter Adaptive Control," Optimization Days, Montreal, Canada, May 1982.



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C. Miscellaneous

1. AFOSR Meeting: The principal investigator attended and participated in the Air Force sponsored Workshop on Adaptive Control held at the University of Illinois in May 1979.
2. Doctoral Students: Two graduate students successfully completed their doctoral research under AFOSR support.
 - i. A. Feuer; Dissertation: "Adaptive Control of Single-Input, Single-Output Linear Systems," 1978.
 - ii. M. E. Evans; Dissertation: "Problems in Nonlinear System Realization Theory, May 1981.

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